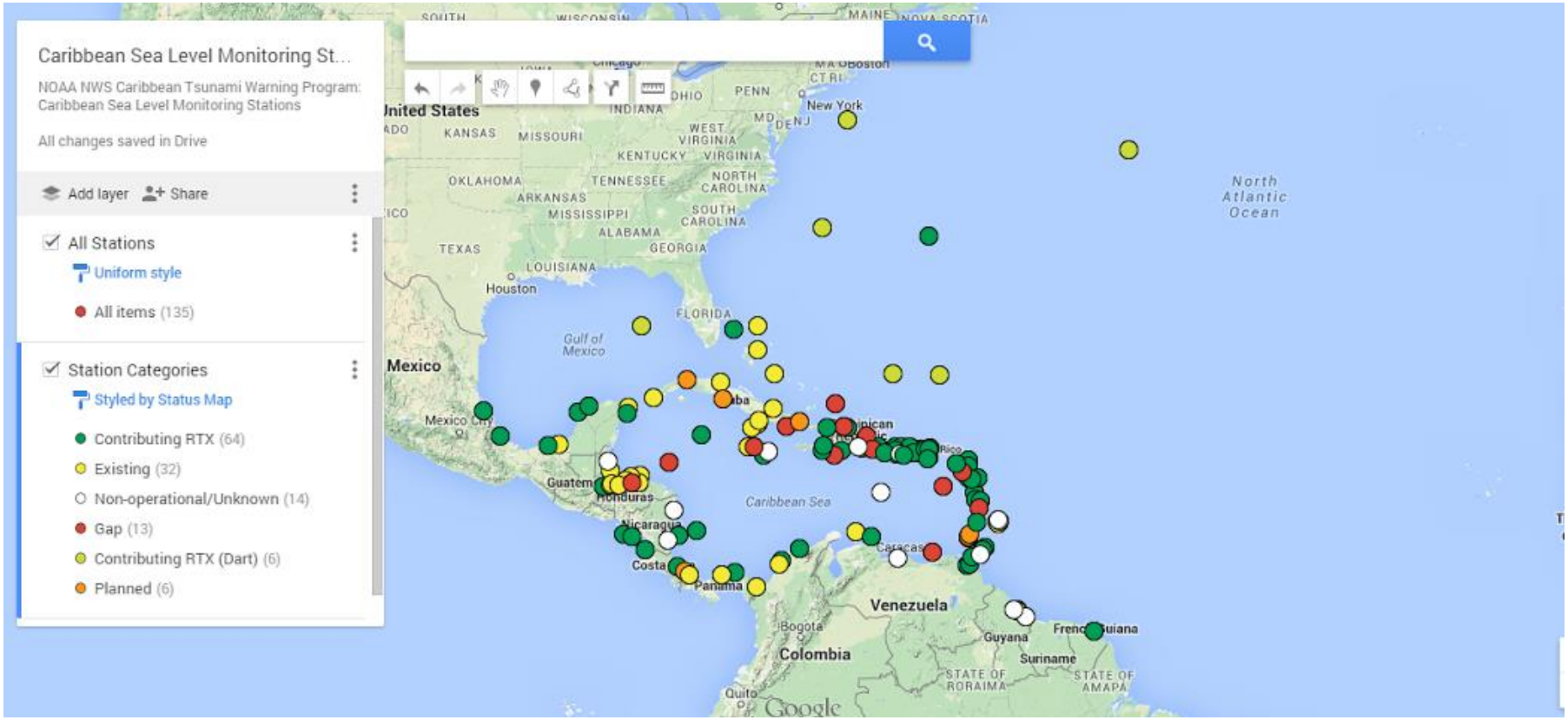
Regional Training Workshop on Pacific Tsunami Warning Center
Enhanced Tsunami Products for ICG/CARIBE EWS
7–10 December 2015
Bridgetown, Barbados

4.5 Tsunami Warning Center Operations:

Sea Level Monitoring in the Caribbean

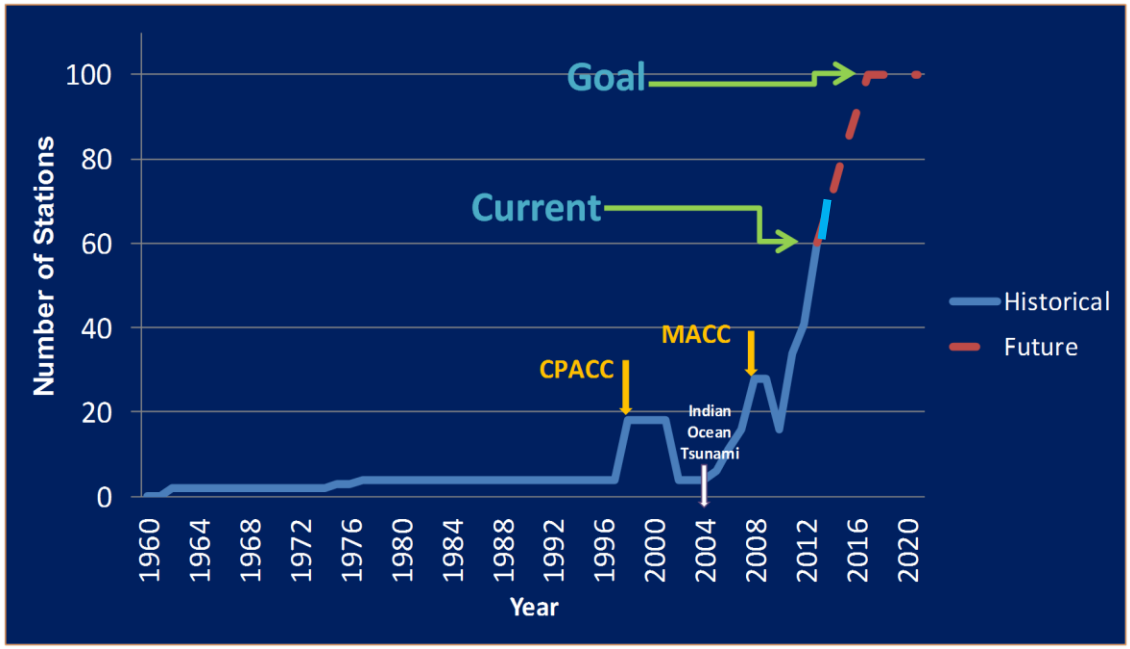
Christa von Hillebrandt-Andrade
NOAA-NWS Caribbean Tsunami Warning Program

Status of CARIBE EWS Sea Level Stations 2015



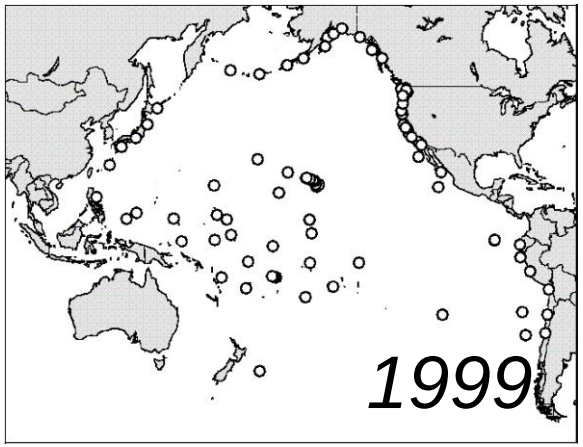
https://www.google.com/maps/d/edit?mid=zblTjtkDlJlE.ksHCt6U0F6zM&usp=sharing

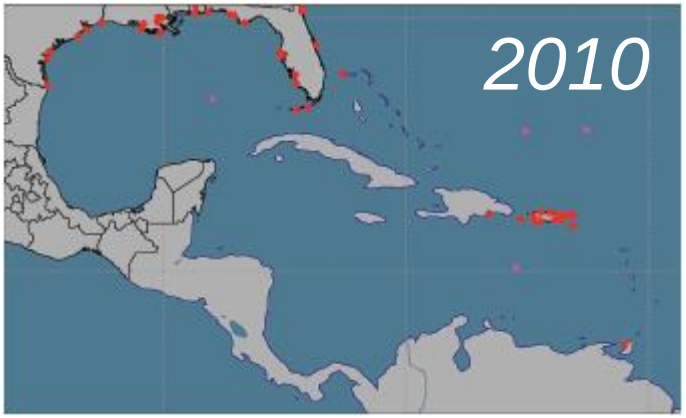
CARIBE EWS Coastal Sea Level Monitoring Stations Progression (1960-2020)



- 62 % (73/118) of implementation plan
- IV CARIBE EWS SL course held Nov. 3-7, 2014 (17 MS/Operators) in PR
- Bimonthly conference calls/webinars w/ operators

Caribbean Sea Level Stations Monitored by PTWC

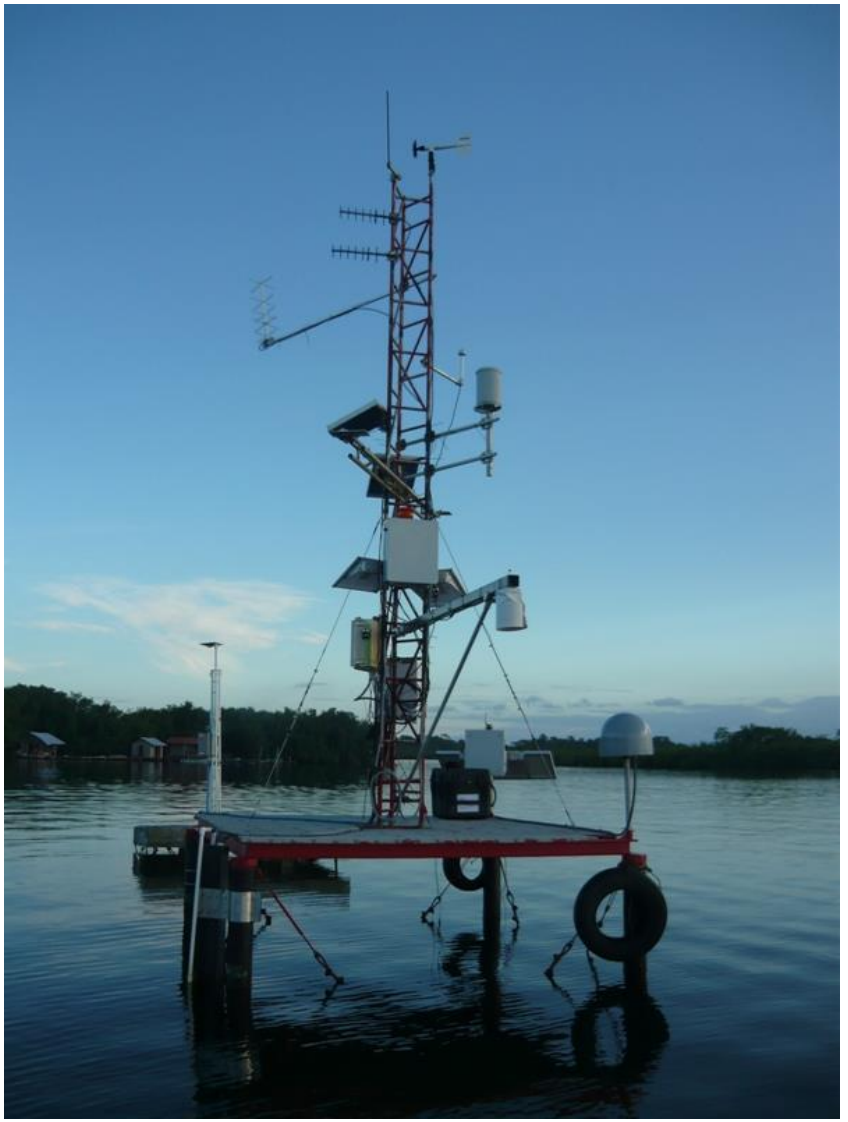




Sea Level Stations – increase from 5 to 74 stations – tsunami detection dropped from 3 hours to 5-30 minutes

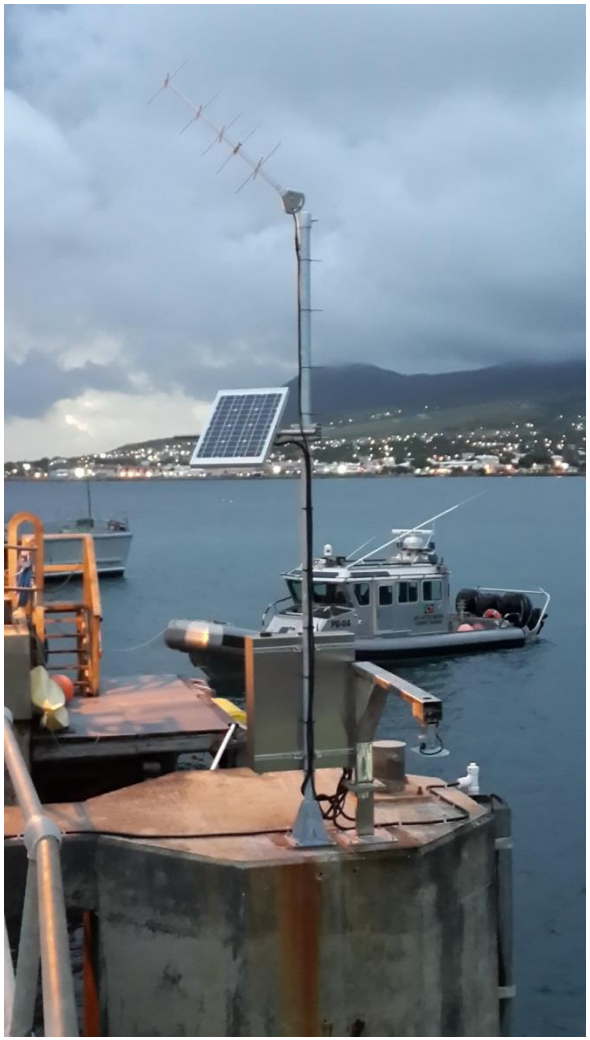
IOC Sea Level Monitoring Facility

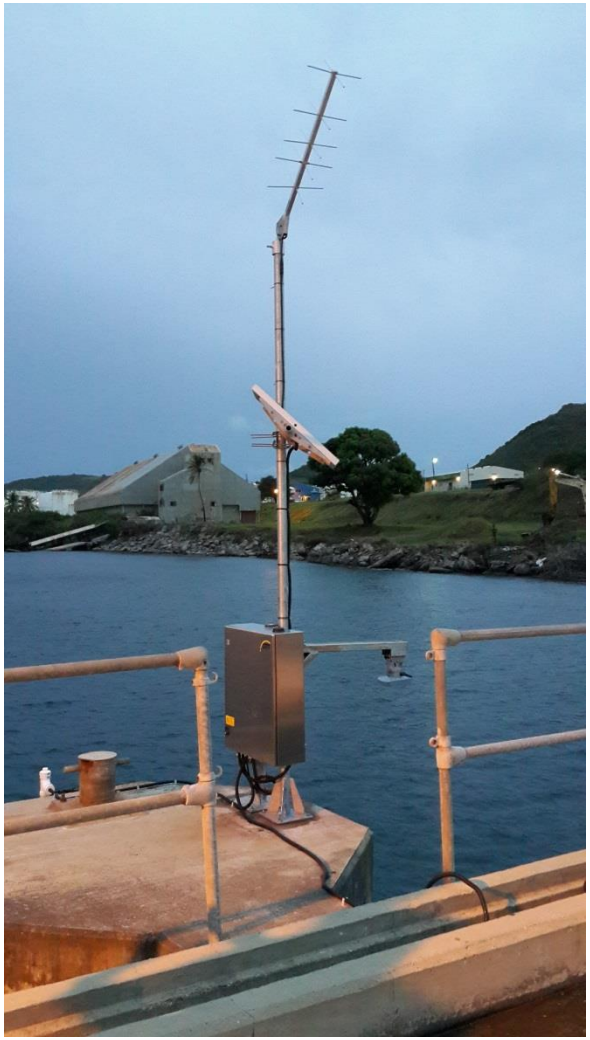
Sea Level Stations Panama



Sea Level Station – St. Kitts

St. Kitts Sea Level Monitoring Station



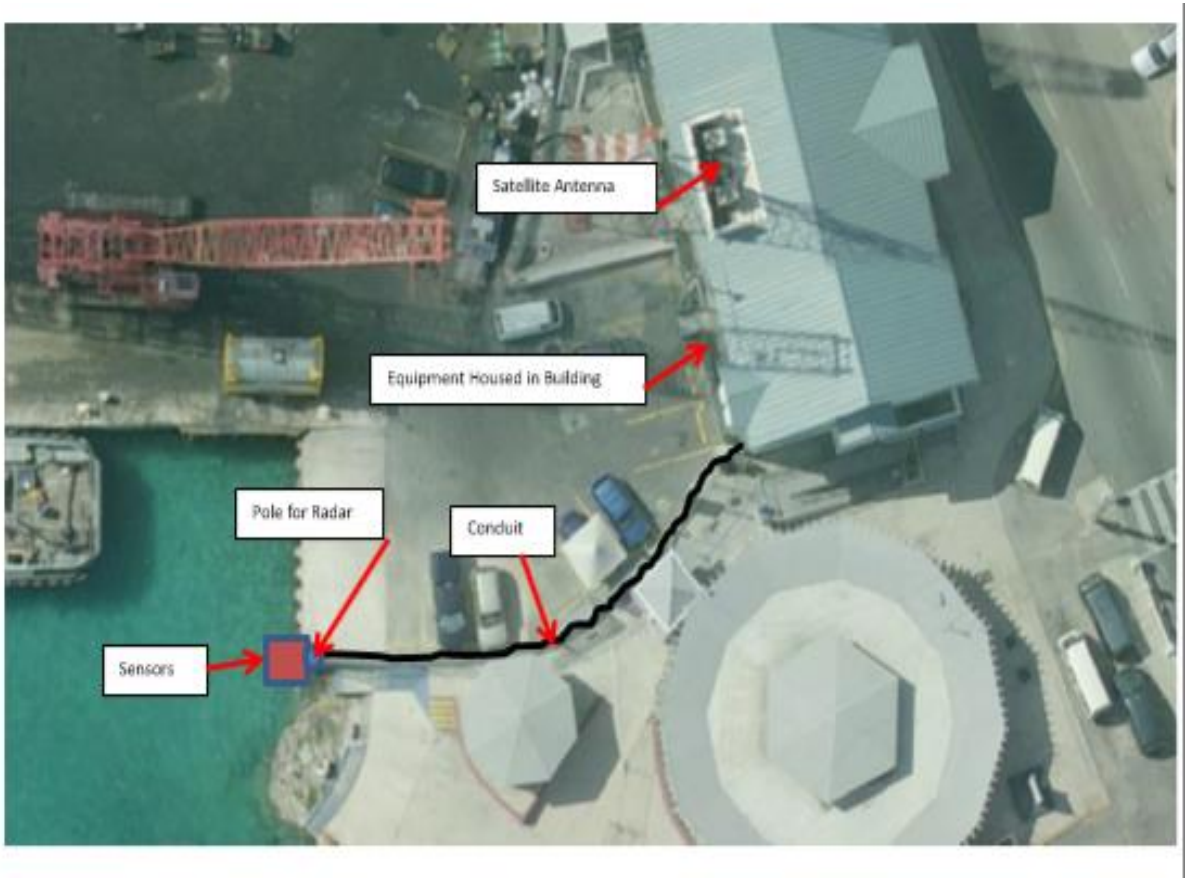


Dominican Republic Sea Level Station

Haiti Sea Level Station

Sea Level Station Aruba

Sea Level Station Cayman Islands



French Network - Guadeloupe

ESTACIONES METEOROLÓGICAS Y OCEANOGRÁFICAS AUTOMÁTICAS SATELITALES - SMPOMM

Dimar
Dirección General Marítima
Autoridad Marítima Colombiana

SENSORES ESTACIONES EMMAS

SENSOR/NOMBRE	UNIDAD DE MEDIDA
TEMPERATURA AMBIENTE (temperatura del aire)	°C
PRESION ATMOSFÉRICA (presión barométrica)	Hpa.
RADIACIÓN SOLAR (radiación global)	Watts /m2
DIRECCIÓN DEL VIENTO (dirección del viento)	Grados 0-360°
HUMEDAD RELATIVA (humedad del aire)	%
PRECIPITACIÓN (precipitación acumulada)	mm
VELOCIDAD DEL VIENTO(velocidad del viento)	m/s
RLS (sensor de nivel de radar)	m
PLS (sensor de nivel de presión)	m
BURBUJEO (sensor de nivel de presión)	m

Puerto Rico – Red Sismica

Se le añadio un radio WILAN-110-24.

Se le cambio el poste que sostiene el anenometro y los paneles solares

Comments »

1. Se intento reestablecer la comunicacion, pero no se pudo. Se probo dos radios (Satlink) pero el problema continua.

   Comment by Jose Cancel — March 21, 2010 @ 4:22 am

2. El 5 de abril del 2010 se instalo un radio Wilan en el mareografo y en la UPRA. Ahora los datos se pueden bajar por una linea adicional de Ethernet.

   Comment by Jose Cancel — May 3, 2010 @ 3:29 pm

3. El 12 de julio de 2010 se le inslatalo un panel solar de mas potencia.

   Comment by Jose D. Cancel — August 15, 2010 @ 6:46 pm

4. A esta estacion se le añadio un panel solar de mas potencia.

   Comment by Jose Cancel — October 7, 2010 @ 7:08 pm

5. El 21 de diciembre de 2011 se le cambio el poste del anenometro. Se aumento la altura del mismo de 20' a 40'.

   Comment by jose cancel — December 22, 2011 @ 11:34 am

CZMU Sea level Station
Port St. Charles, Barbados

Station Code:	PTSC
Lat	13° 15'46.73"N (obtained from google earth)
Long	59° 38'41.47"W (obtained from google earth)
Date Installed	Installed November 2012 by CZMU and CIMH.
Status	Transmitting (power issue needs resolving)
perator:	Coastal Zone Management Unit, Barbados.

Communications	GOES
GOES PID	BAB00078
WMO Header	SOBR10
GOES Channel	219
Transmit Period	5 mins
Sampling Rate	1 min
GLOSS Station ID	
DCP	Satlink2 V2 Transmitter/Logger (SL2-G312-V2)
GPS (timing)	Yes
GPS (high precision for positioning)	No
Sensor #1	ACCULEVEL SUBMERSIBLE TRANSDUCER (needs replacing)
Sensor #2	Accubar Bubble Gauge
Sensor #3	RADAR (RLR-0003-1)
Met Sensors	None

Trinidad and Tobago Sea Level Stations

- **The tidal stations operated by the Hydrographic unit are Microcom GTX data loggers with the ability to transmit real time data to GOES.**

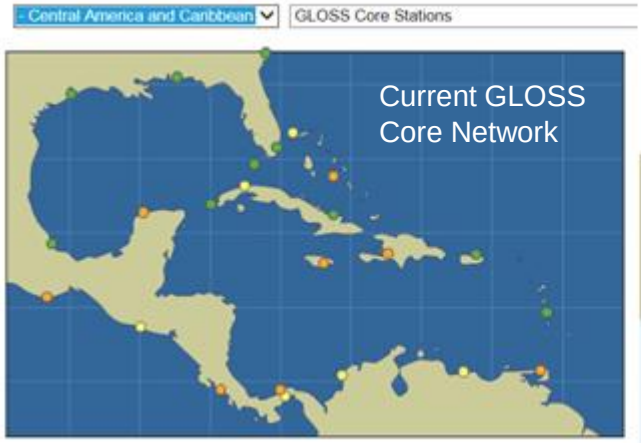
Barbuda

Sea Level Stations – St. Lucia (MACC, non operational)

Future Plans w/ funding from UK…

Other Sea Level Considerations

- **Success in increasing and sustaining more stations – Member State engagement and new stakeholders/donors (eg. Smithsonian Institution, UNAVCO, Monaco, Brazil, St. Vincent and the Grenadines)**
- **CARIBE EWS WG Vice Chair Sea Level (Sebastien Deroussi), CTWP Manager (Christa von Hillebrandt) and GLOSS Chair (Gary Mitchum) reviewing GLOSS Core List for Caribbean, going to recommend some swaps and additions**



Blue circles, proposed new sites for GLOSS Core Network

- **Category 1:** "Operational" stations for which the latest data is 2006 or later.
- **Category 2:** "Probably operational" stations for which the latest data is within the period 1996-2005.
- **Category 3:** "Historical" stations for which the latest data is earlier than 1996.
- **Category 4:** "Stations for which no PSMSL data exist.

Maintenance Challenges

Challenges

- **Maintenance**
  - Biogrowth
  - Sedimentation
- **Power**
- **Sensor malfunction**
- **Vandalism**

Opportunities – Multiple Applications

- Tsunami detection
- Storm surge
- Climate Change
- Seiches - Meteotsunamis
- Coastal Zone Management
- Navigation
- Bathymetric studies/Maritime Surveys

Thank You

Laura Kong
UNESCO/IOC – NOAA International Tsunami Information Center